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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/549,368	04/14/2000	Thomas J. Endres	1172	8245

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EXAMINER	
CHANG, EDITH M	
ART UNIT	**PAPER NUMBER**
2634	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/549,368	ENDRES ET AL.	
	Examiner	Art Unit	
	Edith M Chang	2634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 September 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-35* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-35* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Arguments

1. Applicant's arguments/amendments with respect to claims 1-4, 11-14, & 21 have been considered but are moot in view of the new ground(s) of rejection.

Claim Objections

2. Claims 9, 11-20, & 22-28 are objected to because of the following informalities:

Claim 9, the term "the error terms" in line 3 of the claim lacks antecedences. Add antecedences in this claim or its parent claim to clearly indicate the invention;

Claim 11, line 13 "a single individual signal samples" should be "a single individual signal sample".

Claims 12 & 19-20, in line 1 "An apparatus in accordance with claim 11" is a communications receiver accordance with claim 11. Change "An apparatus in accordance with claim 11" to " A communications receiver in accordance with claim 11";

Claims 13-14, Change "An apparatus in accordance with claim 12" to " A communications receiver in accordance with claim 12" accordingly;

Claims 15 & 16, Change "An apparatus in accordance with claim 4" to "A method in accordance with claim 4". Claim 4 is a method claim not an apparatus claim;

Claim 17, Change "An apparatus in accordance with claim 13" to " A communications receiver in accordance with claim 13";

Claim 18, Change "An apparatus in accordance with claim 14" to " A communications receiver in accordance with claim 14";

Claim 22. Change "An apparatus in accordance with claim 21" to " A communications receiver in accordance with claim 21". It is a communications receiver in claim 21; change "An apparatus" to "A communications receiver" accordingly;

Claims 23 & 24, Change "An apparatus in accordance with claim 22" to " A communications receiver in accordance with claim 22" respectively;

Claim 25, Change "An apparatus in accordance with claim 1" to "A method in accordance with claim 1", wherein the claim 1 is a method claim, not an apparatus claim;

Claims 26 & 27, Change "An apparatus in accordance with claim 25" to "A method in accordance with claim 25" wherein the claim 25 is a method claim;

Claim 28, Change "An apparatus in accordance with claim 21" to "A communications receiver in accordance with claim 21".

Appropriate corrections are required.

3. Claims 5-6, & 15-16 are objected to because claim 5 and claim 15 are duplicate claims, and claim 6 and claim 16 are duplicate claims. Applicants need to cancel claims 5-6 or claims 15-16.

4. Claims 25-27, & 32-34 are objected to because claim 25 and claim 32 are duplicate claims, claim 26 and claim 33 are duplicate claims, and claim 27 and claim 34 are duplicate claims. Applicants need to cancel claims 25-27 or claims 32-34.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1-3, 9, 11-13, 19, 21-23, & 29-30 are rejected under 35 U.S.C. 102(e) as being anticipated by Strolle et al. (US 5872815).

Regarding **claims 1, 11, & 21**, Strolle et al. discloses a communications receiver having a decision feedback equalizer filter (FIG.7), the receiver having an input filter (902 FIG.7) responsive to the received signal to form soft decision samples (output 904/input of 906 FIG.7), and a slicer responsive to the received signal to form hard decision samples (116 FIG.7), the soft decision samples and the hard decision samples comprising a series of individual signal samples (column 4 lines 52-58), a equalizer filter arrangement, and its method for operating the decision feedback equalizer filter comprising: means and method of operating the decision feedback equalizer filter in a first mode by coupling the soft decision samples to the decision feedback equalizer filter (906 FIG.7, column 13 lines 20-23); means and method of operating the decision feedback equalizer filter in a second mode by coupling the hard decision samples to the decision feedback equalizer filter (116-906 FIG.7, where the output of the slicer 116 couples to the DFE via the switch 906); and switching between first and second modes responsive to a single individual signal sample (50, 52 FIG.1, where the 54 responsive to a single individual signal sample).

Regarding **claims 2 & 12**, Strolle et al. discloses the quality level decision (column 3 lines 55-65) that the decision is over the threshold the quantizer (hard decision) is switched into. So the hard decision sample is switched into when the second quality level of the signal sample is greater than the first quality level where the decision does not exceed the threshold (soft decision used).

Regarding **claims 3 & 13**, Strolle et al. discloses the signal sample is at a first quality level when outside a box of width w, at a second quality level when inside box, the box is center about the origin of the complex plane (FIG.9, column 3 lines 55-65, where the threshold is the width w of the box).

Regarding **claims 9 & 19,** Strolle et al. discloses the first mode is a signal acquisition mode using the soft decision samples and constant modulus algorithm to update the error terms of the feedback equalizer filter (column 13 lines 14-25).

Regarding **claims 22-23, & 29-30**, Strolle et al. discloses the algorithm (CMA) used in the one mode (as the first mode) of the two modes (column 2 lines 47-53).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 4-6, 10, 14-16, 20, 24-25, 27-28, 31-32 & 34-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Strolle et al. (US 5872815) in view of Paik et al. (US Patent 5363408).

Regarding **claims 4 & 14**, except the least means square error, Strolle et al. discloses all subject matter claimed. However Paik et al. teaches the least means square error of the individual signal sample is below a threshold (column 1 lines 50-60, column 8 lines 3-10, lines 45-66). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to have the least square error of the individual signal sample is below a threshold taught by Paik et al. in Strolle et al.'s equalizer to have a flexible M-ary QAM communication system (column 1 lines 5-10).

Regarding **claims 5 & 15**, Strolle et al. dose not explicitly specify threshold t, Paik et al. teaches the threshold t is represented as a reliability area comprising a circle in the complex plane (column 8 lines 58-65). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to have this teaching taught by Paik et al. in Strolle et al.'s equalizer to have a reliable and bandwidth efficient system (column 1 lines 45-60).

Regarding **claims 6 & 16**, Paik et al. teaches the threshold t is represented as a reliability area comprising a square in the complex plane (column 8 lines 50-57). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to have this teaching taught by Paik et al. in Strolle et al.'s equalizer to have a reliable and bandwidth efficient system (column 1 lines 45-60).

Regarding **claims 10 & 20**, Strolle et al. does not explicitly specify the apparatus and method whereby the second mode is a signal tracking mode, using the hard decision samples and

the least means squared (LMS) algorithm, to update the error. However Paik et al. teaches the Decision Directed (DD-MSL) in the tracking mode (80 FIG.6, FIG.9; column 8 lines 58-60, column 8 line 67-column 9 line 1). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to have the LMS algorithm in the tracking taught by Paik et al. in Strolle et al.'s equalizer' s second mode to deal the ISI problem (column 1 lines 45-60).

Regarding **claims 25, 27, 32, & 34**, except specify the algorithm used in the second mode, Strolle et al. discloses all subject matter claimed. Paik et al. teaches the samples stored in the CMA PROM as the CMA used in one mode (132 FIG.9), and the samples stored in the LMS PROM (134 FIG.9) as the LMS used in the other mode. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to have the Paik et al.'s LMS teaching in the second mode of the Strolle et al.'s equalizer to deal the ISI problem (column 1 lines 45-60 '408).

Regarding **claims 24 & 31**, Strolle et al. does not specify the algorithm used in the one mode (as the first mode) of the two modes as the LMS. However Paik et al. teaches the first mode is a LMS (column 8 lines 45-50). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to have the Paik et al.'s teaching in the Strolle et al.'s equalizer where the LMS as the first mode of the two modes to deal the ISI problem (column 1 lines 45-60).

Regarding **claims 28 & 35**, Strolle et al. does not specify the algorithm used in each mode. However Paik et al. teaches the samples stored in the CMA PROM as the CMA used in one mode (132 FIG.9), and the samples stored in the LMS PROM (134 FIG.9) as the LMS used in the other mode. At the time of the invention, it would have been obvious to a person of

ordinary skill in the art to have the Paik et al.'s teaching in the Strolle et al.'s equalizer where the CMA in the first mode with soft decision (904-906 FIG.7 '815) and LMS algorithm in the second mode with hard decision (116-906 FIG.7 '815) to deal the ISI problem (column 1 lines 45-60 '408).

9. Claims 7, & 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Strolle et al. (US 5872815) in view of Gardner et al. (US Patent 5848105).

Regarding **claims 7, & 17,** Strolle et al. teaches the claimed limitations (refer to the rationale applied to claims 3 and 13) but does not teach the reliability area i.e. the width w of the box/ the threshold is adaptive based on the qualities of a block of past signal samples. However Gardner et al. teaches the threshold/reliability area/width of the box is adaptive based on the qualities of a block of past signal samples (column 18 lines 15-60, column 19 lines 10-30). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to have this teaching taught by Gardner et al. to have a method fro rejecting interference (column 3 line 65-column 4 line 5).

10. Claims 8, & 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Strolle et al. (US 5872815) in view of Paik et al. (US Patent 5363408), as applied to claims 4 & 14 above, further in view of Gardner et al. (US Patent 5848105).

Regarding **claims 8, & 18,** Strolle et al. does not teach the reliability area i.e. the width w of the box/ the threshold is adaptive based on the qualities of a block of past signal samples. However Gardner et al. teaches the threshold/reliability area/width of the box is adaptive based on the qualities of a block of past signal samples (column 18 lines 15-60, column 19 lines 10-30). At the time of the invention, it would have been obvious to a person of ordinary skill in the

art to have this teaching taught by Gardner et al. to have a method fro rejecting interference (column 3 line 65-column 4 line 5).

11. Claims 26 & 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Strolle et al. (US 5872815) in view of Paik et al. (US Patent 5363408), as applied to claims 25 & 33 above, further in view of Takeuchi et al. (US Patent 6289046 B1).

Regarding **claims 26 & 33**, further Takeuchi et al. teaches the CMA used in the hard decision i.e. the second mode (24, 37 FIG.2; column 7 lines 34-39, column 9 lines 30-35). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to have the CMA taught by Takeuchi et al. in the Strolle et al.'s equalizer hard decision mode to remove the ISI (column 1 lines 9-20).

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edith M Chang whose telephone number is 703-305-3416. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on 703-305-4714. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-4800.

Edith Chang
December 1, 2003

CHIEH M. FAN
PRIMARY EXAMINER